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B60S 1/48

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(56) Documents cited
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(58) Field of search
UK CL (Edition J) A4F FAMA, B7J
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(54) Vehicle water filling systems

(57) A water reservoir 6 of a vehicle, such as the reservoir of a screen washer system, is filled with rainwater by way of an inlet assembly 2 positioned in an upper surface of the vehicle within a drainage channel 3. The inlet assembly 2 is connected by a flexible pipe 4 to a filling assembly 5, incorporating a filter, for filling the water reservoir 6. A further flexible pipe 7 conducts excess rainwater to a drainage point. Such an arrangement dispenses with the need to top up the water reservoir, and prevents the screen washer system from running out of water.

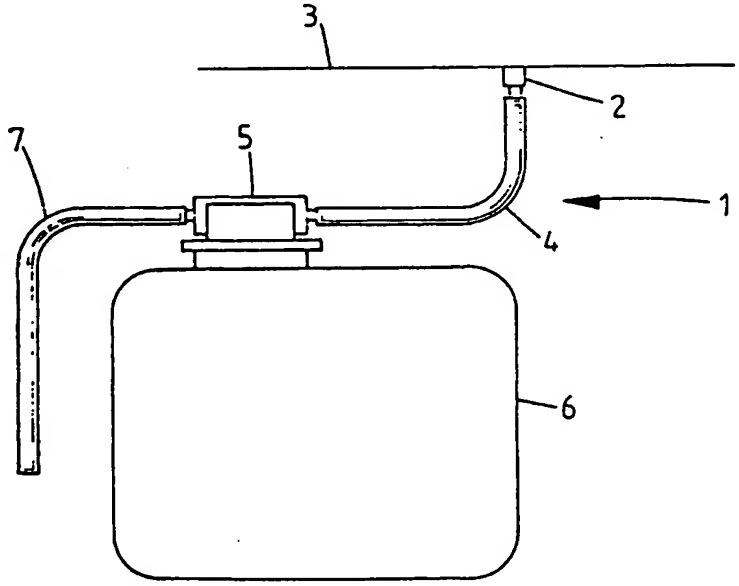

FIG.1.

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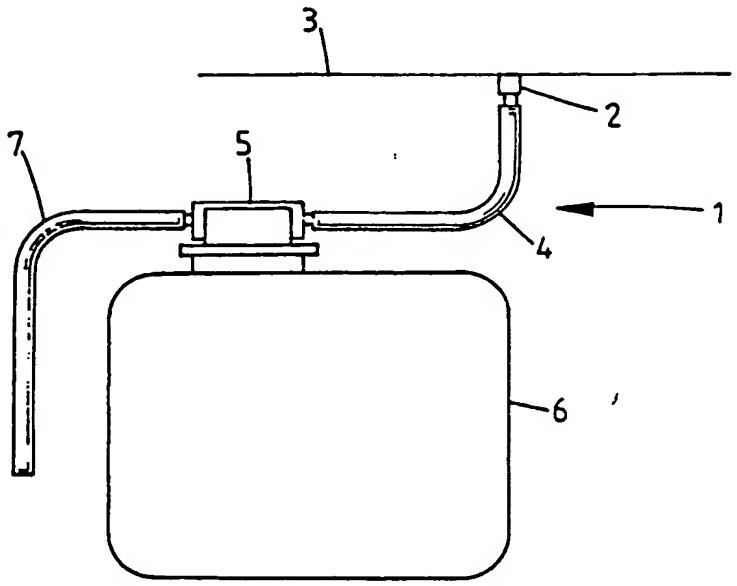

FIG.1.

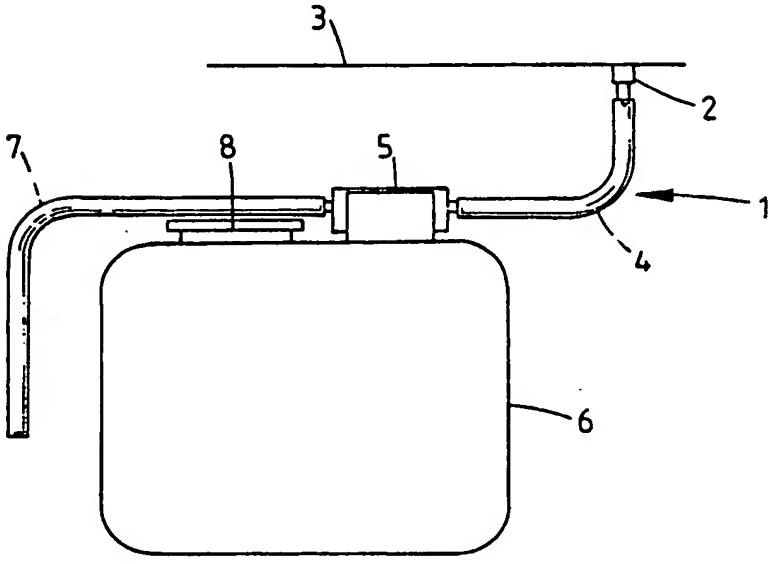

FIG.2.

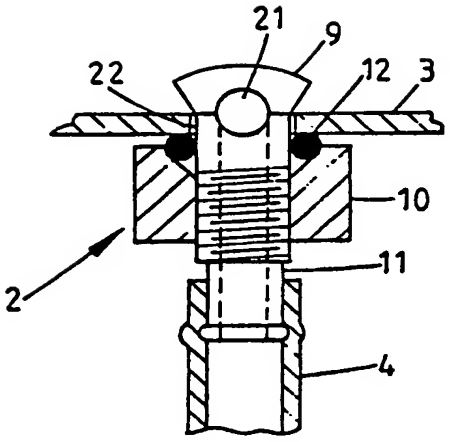

FIG.3.

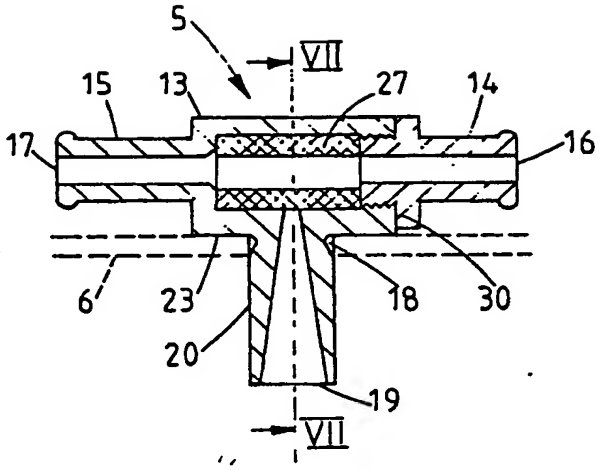

FIG.4.

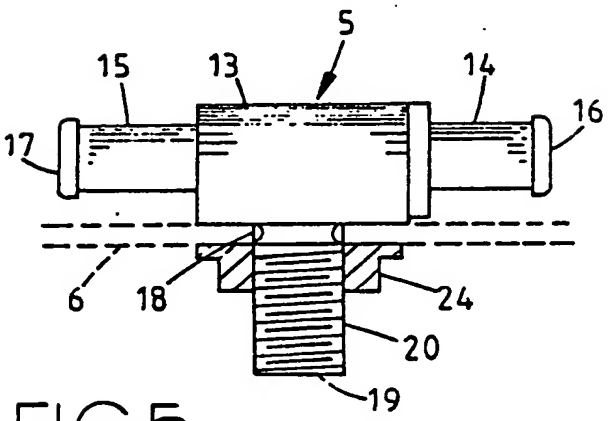

FIG.5.

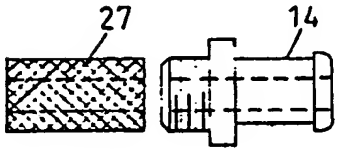

FIG.6.

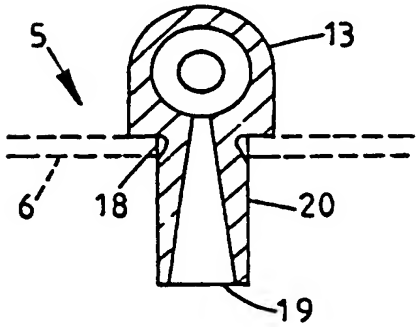

FIG.7.

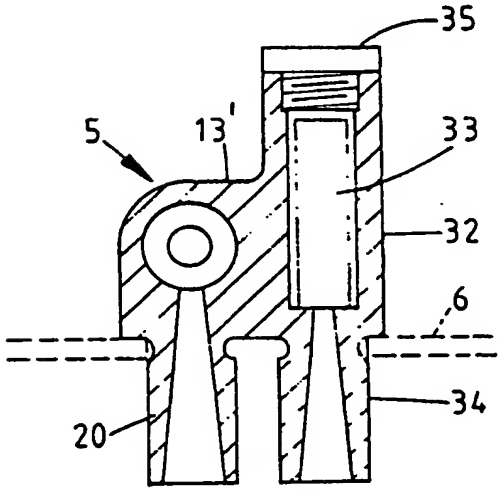

FIG.8.

"Vehicle Water Filling Systems"

This invention relates to vehicle water filling systems.

Motor vehicles commonly include screen washer systems comprising at least one water reservoir and nozzles for directing a jet of water from the reservoir on to the vehicle windscreen or rear window or headlamps. Whilst the water reservoirs fitted to such vehicles are generally of large capacity so that such systems run out of water relatively infrequently, it is possible for such systems to run out of water at a time when it is dangerous to proceed with the screen washer system out of action and when it is not possible to stop to refill the system, for example when travelling on a motorway.

It is an object of the invention to provide a novel form of vehicle water filling system which can be used to overcome this disadvantage.

According to the present invention there is provided a vehicle water filling system comprising water inlet means adapted to be positioned in an upper surface of the vehicle such that rainwater falling on said upper surface drains towards the inlet means, and reservoir filling means connected to receive rainwater from the inlet means and adapted to fill a water reservoir with the rainwater so received.

In a preferred form of the invention the filling system is adapted to be fitted to a vehicle as part of screen washer apparatus, in which case the

filling system may be installed in the vehicle at the same time as the other parts of the screen washer apparatus, such as the screen washer reservoir, or alternatively the filling system may be installed in a vehicle already fitted with conventional screen washer apparatus in a subsequent fitting operation.

The use of such a system enables the screen washer reservoir to be automatically topped up with rainwater or even with water from some other source such as a car wash. Since many modern cars require to be serviced relatively infrequently, many motorists only ever open the bonnets of their cars to check and refill the screen washer reservoir. This system eliminates the need even to do this.

However, the filling system of the invention can also be installed in a vehicle for supplying water to any other vehicle system which requires a supply of water, such as a vehicle cooling system or a drinking water storage system.

Conveniently the filling system of the invention includes water outlet means for discharging excess rainwater from the system when the reservoir has been filled.

The reservoir filling means advantageously includes a filter for filtering the rainwater supplied to the reservoir.

The reservoir filling means preferably comprises a body having an inlet for connection to the

inlet means, a first outlet for connection to outlet means, and a second outlet for communicating with the interior of the reservoir.

The body of the reservoir filling means may be in the form of a filler cap for fitting to a filler opening of the reservoir.

Alternatively the body of the reservoir filling means may be adapted to extend through a wall of the reservoir.

The second outlet in the body of the reservoir filling means may be in the form of a projecting nozzle having an internal cross-section which increases in the direction away from the body.

The inlet means may comprise an inner member having an axial bore and, coaxial therewith, an externally threaded portion for extending through an aperture in said upper surface, and an outer member having an internally threaded sleeve portion for receiving said externally threaded portion.

The inlet means and/or the outlet means may include flexible pipe means.

The filling system may additionally include a detergent dispenser for holding a supply of detergent to be dispensed to the reservoir in use.

The invention further provides the combination of a vehicle water filling system and a vehicle water reservoir.

In order that the invention may be more fully

understood, reference will now be made, by way of example, with reference to the accompanying drawings, in which:

Figures 1 and 2 are schematic diagrams of two alternative systems in accordance with the invention;

Figures 3 and 4 are vertical sections through parts of the second system;

Figure 5 is a side view of the part of Figure 4;

Figure 6 is a side view of a filter assembly used in the part of Figure 4;

Figure 7 is a vertical section taken along the line VII-VII in Figure 4; and

Figure 8 is a similar section of a modification of the second system.

Referring to Figure 1 the vehicle water filling system 1 illustrated therein comprises an inlet assembly 2 positioned in an upper surface of the vehicle within a drainage channel 3 so that a proportion of the rainwater passing along the drainage channel 3 passes into the inlet assembly 2. The inlet assembly 2 is connected by a flexible pipe 4 to a filling assembly 5 for filling a water reservoir 6. A further flexible pipe 7 conducts excess rainwater to a drainage point. In the system of Figure 1 the filling assembly 5 forms part of a filler cap of the reservoir 6. In the system of Figure 2, which is otherwise similar to the system of Figure 1, the filling assembly 5 extends through an upper wall of the reservoir 6 and is separate from the filler cap 8 of the reservoir

6.

Figure 3 shows the inlet assembly 2 in more detail. The assembly 2 comprises an inner member 9 in the form of a special screw and an outer member 10 in the form of a special nut. A transverse bore 21 extends through the head of the inner member 9 and intersects an axial bore 11 extending therethrough and opening into the pipe 4 so as to provide for flow of rainwater from the drainage channel 3 to the pipe 4. If required a coarse first stage filter (not shown) may be accommodated within the transverse bore 21. In order to fit the assembly 2, the inner member 9 is passed through an aperture 22 drilled in the drainage channel 3, and the outer member 10 is screwed onto the inner member 9 from below. A rubber seal 12 is provided between the outer member 10 and the underside of the drainage channel 3 in order to seal the gap between the inner member 9 and the edge of the aperture 22.

Figure 4 shows a vertical section through the filling assembly 5 of Figure 2 which extends through an upper wall of the reservoir 6. The assembly 5 has a body 13 made up of an inlet portion 14 and an outlet portion 15 connected together by a screw connection. The portion 14 defines an inlet 16 and is shaped for connection to the pipe 4, and the portion 15 defines an outlet 17 and is shaped for connection to the pipe 7. In addition a further outlet portion 20 defines a second outlet 19.

The assembly 5 is fitted to the reservoir 6 by drilling a hole 18 through the wall of the reservoir 6,

and by then inserting the outlet portion 20 through the hole 18 so as to seat a bottom surface 23 of the body 3 on the wall of the reservoir 6. Permanent attachment of the assembly 5 to the reservoir 6 is ensured by coating of the surfaces to be joined with adhesive. Alternatively the outlet portion 20 may be externally screwthreaded as shown in Figure 5, and may either be screwed directly into the wall of the reservoir 6 or be passed through the hole 18 and secured therein by a nut 24. Such an attachment method is preferred when the filling assembly 5 forms part of a filler cap of the reservoir 6.

For best results the inlet 16 and the outlet 17 should be at the same level. Furthermore the inlet 16 and outlet 17 are of the same size. The inlet portion 14 forms a separate part from the remainder of the body 13 and is adapted to be screwed into a screwthreaded bore 30 in the body 13 and to retain therein a replaceable sleeve-shaped filter 27 which may be made from paper, metal or a plastics material, or from a combination of all these materials. Figure 6 shows the filter 27 and the inlet portion 14 detached from the assembly 5. In use water passing through the inlet 16 may fall through the filter 27, leaving behind any debris on the filter 27, and may then pass through the outlet portion 20 into the interior of the reservoir 6. When the reservoir 6 is filled to the level of the filter 27, water entering the inlet 16 passes beyond the filter 27 to the outlet 17 and from there along the pipe 7 to the drainage point, taking with it any

debris lying on the internal surface of the filter 27.

During movement of the vehicle the water level within the reservoir 6 is caused to rise and fall. Due to the fact that the outlet portion 20 is in the form of a nozzle having an internal cross-section which increases in the direction away from the body 13, the effect of water level changes in the outlet portion 20 is to cause water to accelerate upwardly within the outlet portion 20 and to provide back flushing of the filter 27.

In a modification of the system just described, which is illustrated in Figure 8, the body 13' of the filling assembly 5 is formed with a dispenser 32 for a block of detergent 33. A further nozzle part 34 similar to the nozzle part 20 places the interior of the dispenser 32 in fluid communication with the interior of the reservoir 6. It will be appreciated that the detergent block 33 will be contacted by the water in the reservoir 6 both when the reservoir is full and when a water surge takes place in the reservoir 6 due to the motion of the vehicle. The detergent block 33 will be gradually dissolved by contact with the water and will thus serve to supply small quantities of detergent to the reservoir 6 over a long period of time. When the block 33 is used up it can be replaced by a fresh block by removing a cap 35 of the dispenser 32.

The above-described water filling system provides a particularly straightforward means for keeping a water reservoir automatically topped up with water. The

water flows by gravity from the inlet assembly, and a minimum of a 1 inch head must be provided to ensure efficient working of the gravity feed. Provided that the level of rainfall is normal the reservoir should be kept topped up whether the vehicle is stationary or in motion, when the system is used in the temperate regions.

CLAIMS

1. A vehicle water filling system comprising water inlet means adapted to be positioned in an upper surface of the vehicle such that rainwater falling on said upper surface drains towards the inlet means, and reservoir filling means connected to receive rainwater from the inlet means and adapted to fill a water reservoir with the rainwater so received

2. A filling system according to claim 1, which includes water outlet means for discharging excess rainwater from the system when the reservoir has been filled.

3. A filling system according to claim 1 or 2, wherein the reservoir filling means includes a filter for filtering the rainwater supplied to the reservoir.

4. A filling system according to claim 1, 2 or 3, wherein the reservoir filling means comprises a body having an inlet for connection to the inlet means, a first outlet for connection to outlet means, and a second outlet for communicating with the interior of the reservoir.

5. A filling system according to claim 4, wherein the body of the reservoir filling means is in the form of a filler cap for fitting to a filler opening of the reservoir.

6. A filling system according to claim 4, wherein the body of the reservoir filling means is adapted to extend through a wall of the reservoir.

7. A filling system according to claim 4, 5 or 6,

wherein the second outlet in the body of the reservoir filling means is in the form of a projecting nozzle having an internal cross-section which increases in the direction away from the body.

8. A filling system according to any preceding claim, wherein the inlet means comprises an inner member having an axial bore and, coaxial therewith, an externally threaded portion for extending through an aperture in said upper surface, and an outer member having an internally threaded sleeve portion for receiving said externally threaded portion.

9. A filling system according to any preceding claim, which includes a detergent dispenser for holding a supply of detergent to be dispensed to the reservoir in use.

10. A vehicle water filling system substantially as hereinbefore described with reference to one or more figures of the accompanying drawings.

11. The combination of a vehicle water filling system according to any preceding claim and a vehicle water reservoir.

Amendments to the claims have been filed as follows

1. A vehicle water filling system comprising water inlet means for positioning in an upper surface of the vehicle such that rainwater falling on said upper surface drains towards the inlet means, reservoir filling means for connection to the inlet means to receive rainwater therefrom and for connection to the top of a water reservoir to supply rainwater to the reservoir, and water outlet means for connection to the reservoir filling means to discharge excess rainwater from the system when the reservoir has been filled, wherein the reservoir filling means includes wall means defining a passage which is substantially horizontal in use and which provides a flow path for rainwater from the inlet means to the outlet means, and a weir which is formed by a valveless opening in the wall means intermediate the ends of the passage and over which rainwater may fall into the reservoir.

2. A filling system according to Claim 1, wherein the reservoir filling means includes a filter for filtering the rainwater supplied to the reservoir, the filter being disposed at the weir so that rainwater falling over the weir passes through the filter on its way to the reservoir.

3. A filling system according to Claim 2, wherein the filter is so disposed that, when the reservoir has been filled, excess rainwater flowing from the inlet means to the outlet means passes over the filter and